

Claims

[c1] 1. A DTMF decoder that combines software and hardware, comprising:
an amplifier, used to amplify and reshape a DTMF signal and output an
amplified DTMF signal;
an analog to digital converter, coupled to the amplifier, used to convert the
amplified DTMF signal from analog to digital and output a digital DTMF signal;
and
a CPU, coupled to the analog to digital converter, used to perform a digital
filtering on the digital DTMF signal to complete a decoding operation.

[c2] 2. The DTMF decoder that combines software and hardware of claim 1, wherein
the amplifier comprises a non-invert terminal, an invert terminal, and an output
terminal.

[c3] 3. The DTMF decoder that combines software and hardware of claim 2, wherein
the non-invert terminal couples to a first terminal of a telephone line, the invert
terminal couples to a second terminal of the telephone line, and the output
terminal outputs the amplified DTMF signal.

[c4] 4. A DTMF decoder that combines software and hardware, comprising:
an amplifier, used to amplify and reshape a DTMF signal and output an
amplified DTMF signal;
an analog to digital converter, coupled to the amplifier, used to convert the
amplified DTMF signal from analog to digital and output a digital DTMF signal;
and
a digital logic operation circuit, coupled to the analog to digital converter, used
to perform a digital filtering on the digital DTMF signal.

[c5] 5. The DTMF decoder that combines software and hardware of claim 4, wherein
the amplifier comprises a non-invert terminal, an invert terminal, and an output
terminal.

[c6] 6. The DTMF decoder that combines software and hardware of claim 5, wherein
the non-invert terminal couples to a first terminal of a telephone line, the invert
terminal couples to a second terminal of the telephone line, and the output

terminal outputs the amplified DTMF signal.

- [c7] 7. An operating method of a DTMF decoder that combines software and hardware, comprising:
 - amplifying and reshaping a DTMF signal to output an amplified DTMF signal;
 - converting the amplified DTMF signal from analog to digital to output a digital DTMF signal; and
 - performing a digital filter on the digital DTMF signal to complete a decoding operation.
- [c8] 8. The operating method of a DTMF decoder that combines software and hardware of claim 7, wherein the DTMF signal is amplified and reshaped by an amplifier.
- [c9] 9. The operating method of a DTMF decoder that combines software and hardware of claim 8, wherein the amplifier comprises a non-invert terminal, an invert terminal, and an output terminal.
- [c10] 10. The operating method of a DTMF decoder that combines software and hardware of claim 9, wherein the non-invert terminal couples to a first terminal of a telephone line, the invert terminal couples to a second terminal of the telephone line, and the output terminal outputs the amplified DTMF signal.
- [c11] 11. The operating method of a DTMF decoder that combines software and hardware of claim 7, wherein the amplified DTMF signal is converted from analog to digital by an analog to digital converter.
- [c12] 12. The operating method of a DTMF decoder that combines software and hardware of claim 7, wherein a digital filtering is performed on the digital DTMF signal to complete a decoding operation by a CPU.
- [c13] 13. The operating method of a DTMF decoder that combines software and hardware of claim 7, wherein a digital filtering is performed on the digital DTMF signal to complete a decoding operation by a digital logic operation circuit.